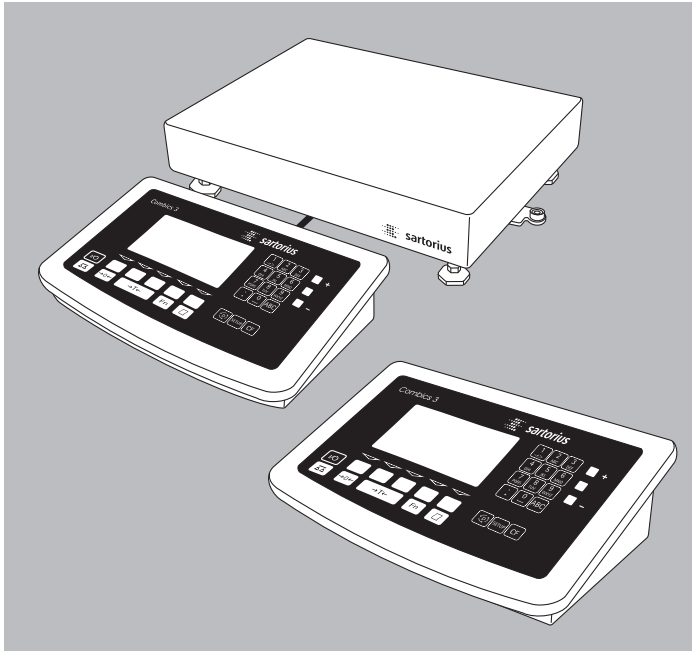
Service Manual

Sartorius Combics 3

Models CW3P | CW3S
for Complete Combics Scales,

Models CISL3 | CIS3
for Combics Indicators



WCI5003-e03082

Contents

04 Overview
04 Service Concept
04 General Information
05 Different to Combics1/2
05 Accompanying Literature
06 Description of the Equipment
07 Operating Design
07 Data Input
08 Keypad Input
09 Function Keys (Soft Keys)
09 Numeric Input Through the Keypad
10 Input Through the Weighing Platform
10 Input Through the Digital I/O Port
10 Input Through the COM Port
11 Activating the xBPI Protocol
11 Activating the Service Mode
12 Activating the Service Mode
12 Turn on the Combics
13 Open the menu
13 Exiting the Service mode
14 Service Menu
16 Configuring the Analog/Digital Converter
16 Purpose
16 Features
16 Note on Settings
17 Overview of the Setup Menu in Service Mode
17 Input of the service password
17 Setup - Device - WP1
18 WP1 - Internal - Calibration / Adjustment
19 Setup - Device - WP1 / COM1 / COM2
20 Setup-Menu for A/D Converter Configuration (Page1)
21 Setup-Menu for A/D Converter Configuration (Page2)
22 Type Designation
22 Complete Combics scale
22 Complete Combics stainless steel scale

General

Service Concept

Prerequisites for performing maintenance and repair work on Sartorius Combics scales requires considerable experience with both indicators and weighing platforms.
In case of defects, repairs are performed on site. Generally, the equipment is not replaced.

General Information

- Do not connect or disconnect cables to or from the equipment; always disconnect the power cable from the wall socket (mains supply) first!

- To ensure safety, an isolating transformer must be installed between the indicator and the power supply before performing work that entails opening the Combics indicator housing.

Different to Combics1/2

- Indicator
- Operating Concept
- Activating the XBPI Protocol
- Activating the Service Mode
- Service Mode
- A/D Converter Configuration
- Additional Menus in Service Mode

Important:

Mechanical and electrical service or repair work on the complete Combics scale requires considerable experience, and for this reason should be performed only by Sartorius technicians trained at the factory. Any attempt to perform repair work can result in damage to the equipment.

Accompanying Literature

Operating instructions for "Complete Combics 3 Scales"	WCW6002-e02101	98648-011-25
Operating instructions for "Combics 3 Indicators"	WCI6002-e02101	98648-011-20
Operating instructions for "Basic Application Programs"	WCI6003-e02101	98646-002-06
Service Manual "Combics 1 | Combics 2"	WCI5001-e02104	

Description of the Equipment

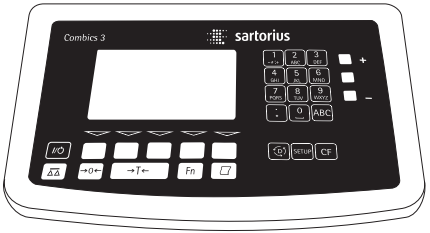
The complete Combics scales from Sartorius are primarily used in industry. Because there are a number of hardware configurations to choose from, Combics models are constructed according to customer requirements.

The complete Combics scale consists of:

– A choice of weighing platforms with capacities from 3 kg to 3000 kg (in stainless steel or steel) and indicators

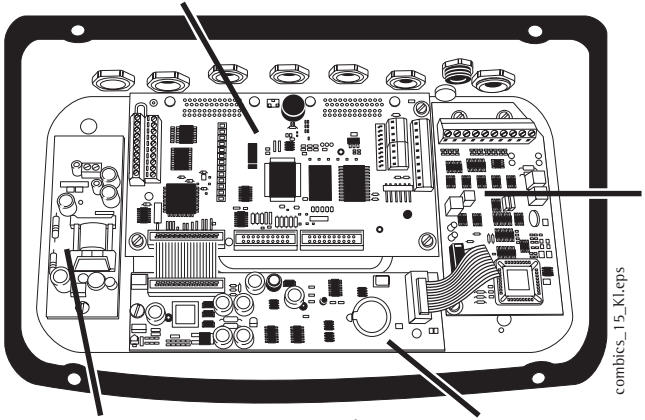
The Combics 3-indicators consist of:

– Front panel with keypad and digital display (Combics 2 has additional keys and LEDs)



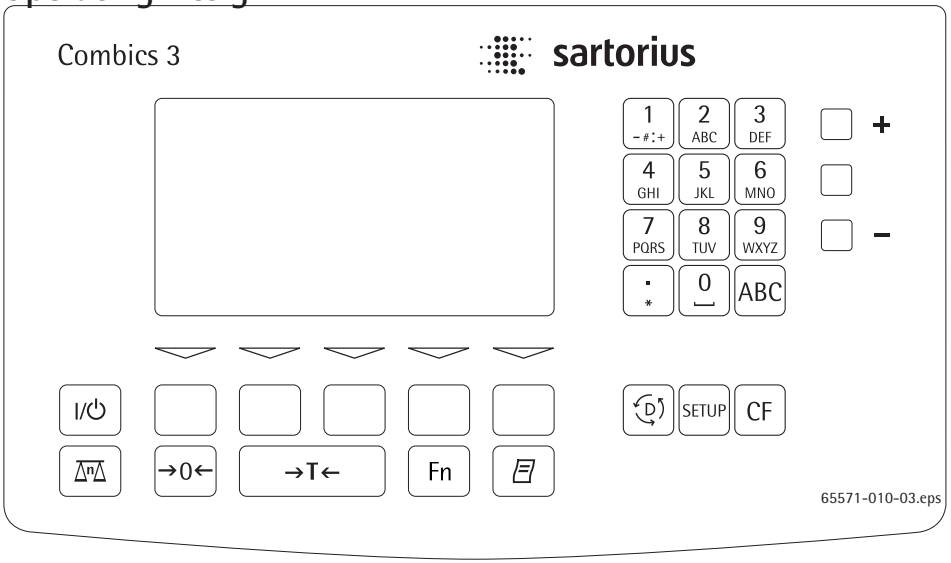
combics3_04.eps

– Combics indicators are equipped with either cable glands or D-Sub 25 connectors.


Digital PCB with application processor, memory, RS-232 interfaces
Analog/digital converter
Power PCB
DC/DC converter (Combics3 has a clock chip)
combics_15_KI.eps

Note: Additional electronic subassemblies are optional.

Operating Design



With Combics 3 you can

- collect weight values from two weighing platforms
- use application programs to calculate and display results
- assign codes to identify the samples weighed

Before you begin, you need to configure your Combics complete scale for your requirements. This is achieved by setting parameters in the operating menu (for example, to configure a connected printer). You can then begin operation, with functions active for storing and calculating weighing data.

The description of the operating design is divided into the following sections:

- Data Input
- Display Modes
- Error Codes
- Data Output
- Saving Data

Data Input

There are a number of options for entering data:

- Through the indicator keypad (e.g., with the 0, 1, 2... 9 keys)
- Through the weighing platform (e.g., tare values)
- Through the digital input |output interface
- Through the COM port
- Through a bar code scanner or external keyboard

Keypad Input

Labeled Keys

These keys always have the function indicated by the label, but the functions
might not be available at all times. Whether a function is available at a given time depends on the operating state of the scale and the menu settings active at that time. Some of the keys have a second function, activated by pressing and holding the key for longer than 2 seconds.

[I/⏻] On/off
Turn the Combics on and off or switch it to the standby mode.
In standby mode, the display shows OFF.

[⚖] Toggle the display between connected weighing platforms.
With two weighing platforms connected, this key toggles the display between the two readouts.

[→0←] – Zero the scale
– Cancel a calibration/ adjustment procedure

[→T←] – Press briefly (< 2 sec): Tare the weighing platform
– Press and hold (> 2 sec): Activate calibration/adjustment

[Fn] Toggles the display between:
– first and second weight unit, or
– gross and net values, or
– normal and 10-fold higher resolution, depending on your settings in the operating menu.

[🖹] – Press briefly: Print
– Press and hold: Print GMP footer

[↶D↷] Press and hold: Toggle to info mode (only when an initialized application is active)

[SETUP] – Access to Setup program
– Exit the Setup program

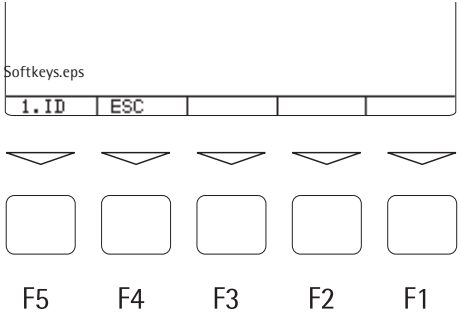
[CF] – Press briefly: Quit application program, delete input character
– Press and hold: Delete entire input string

[0], [1], [2]... [9], [·]
Enter numbers, letters and other characters

[ABC] Toggle between numeric and alphabetic input

Function Keys (Soft Keys)

The current function of a given soft key is indicated in the last line on the display (footer). Functions are indicated by abbreviated texts or symbols .



Texts (Examples)

1st ID: Store the first ID line

ESC: Cancel input

Symbols in the footer:

<< Return to initial state

< : Go one level higher

> : Show items under selectedentry

^ : Move up one position in I/O window

v : Move down one position in I/O window

↵ : Confirm selected parameter setting

Numeric Input Through the Keypad

- Enter numbers one digit at a time: Press [0], [1], [2]... [9] as needed
- Store input: Press the required key (e.g., press [→T←] to store manual tare input)
- ○ Deleting a digit: Press [CF] briefly
- ○ Deleting entire input string: Press and hold [CF] (> 2 sec)

Text Input Through the Keypad

- Press the [ABC] key

> 'ABC' is displayed

- Press the key on which the desired letter is printed repeatedly, until that letter is displayed (please note that keys can activate other characters in addition to those shown on the key)
- ○ If the next letter or character you wish to enter is activated by the same key as the previous character, press the ↵ soft key or wait 2 seconds before entering the next character.

○ Entering a space:
Press the [0] key

○ Entering punctuation or special characters:
Press the [1] key or [·] key repeatedly until the desired character is displayed, and then press the ↵ soft key to insert it in the string.

○ Deleting characters:
Press [CF] briefly

○ Deleting entire input string:
Press and hold [CF] (> 2 sec)

○ Exit text input mode and return to numeric input mode:
Press the [ABC] key

> 123 is displayed

● Store input:
Press the required soft key (for example, **1st ID**)

Input Through the Weighing Platform

You can store the weight on the weighing platform; for example, as a tare weight (press the [→T←] key)

Input Through the Digital I/O Port

An input control line is available for use with all application programs, for connecting a remote hand switch or foot switch. Configure this input line in the Setup program, under **Device parameters - Control input** to assign one of the following functions to the remote switch:

- Print key
- Print key - long
- Tare key
- Tare key - long
- Fn key
- WP toggle key

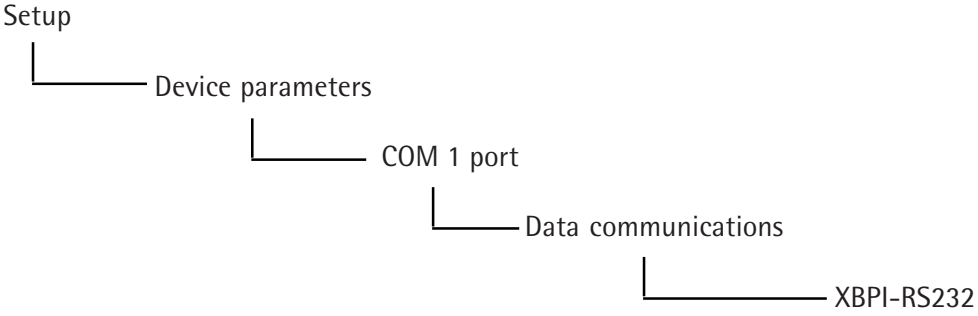
Input Through the COM Port

The Combics scale is equipped with a simple ASCII interface (SBI) for data transfer. The functions are described in detail in the chapter entitled „Operating the Combics“, under „Data Output Functions“.

Activating the xBPI Protocol

Activate the xBPI protocol to perform adjustment with the service software Sartocas software or Psion server without activating the BPI mode through the SBI/BPI key.

Note: This menu item is accessible in the standard menu.



Note: Under **xBPI** a submenu is opened for assigning addresses, but this function is only available when using xBPI with RS-485.

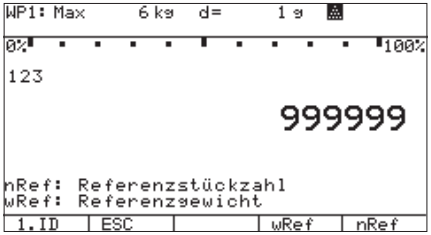
Activating the Service Mode

Purpose

The Service mode allows access to an extended menu. This mode must be activated before you can perform calibration and adjustment work on the Combics and on any connected weighing platform.

When the Service mode is active, an „S" is shown on the right-hand side of the header line in the Setup menu. To deactivate the Service mode, restart the indicator (turn the indicator off and back on again).

Turn on the Combics

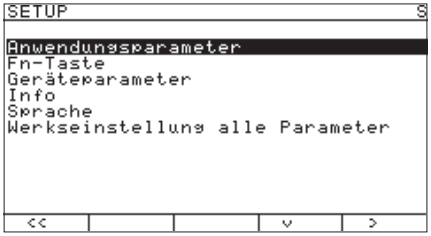


SuS001_d.bmp

The weighing instrument is currently in an application mode (such as Weighing or, as in this example, Counting).

Enter the service password (see Appendix) and press SETUP to confirm.

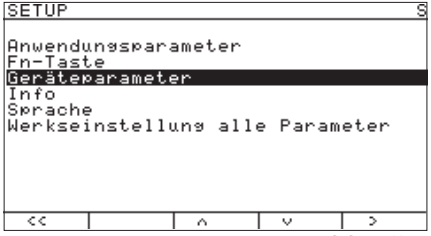
Note:
The number shown in the illustration on the left is not the service password.



SuS002_d.bmp

The device in now is Service mode. On the right-hand side of the Setup menu header line,
an **S** is displayed.

In the Service mode, the Setup menu contains additional menu items that are not available in the user Setup mode; for example, the highest menu level now includes the option **Factory settings: all parameters**.
To view or change device parameters in Setup mode:
Select **Device parameters**



SuS003_d.bmp

Open the menu.

The **Device** submenu is opened.

SuS004_d.bmp

Select the desired menu item from the next level and open the next submenu. Repeat this procedure until the desired menu item in the lowest menu level can be opened.
Check the setting and change if necessary (press ↵ to confirm) and then press the < soft key
(repeatedly, as needed) until the highest level of the Setup menu is reached.

Exiting the Service mode

Turn the Combics off and then on again. The scale is now in the normal application mode.
If you exit the Setup menu without confirming changes by pressing the SETUP or << soft key, the Service mode remains active. Press the SETUP key to open the Setup menu in Service mode again.

Service Menu

When the Service mode is activated, the service technician can access additional menu items that are not visible when the Service mode is deactivated.

The following advanced functions are available:

In the highest menu level, the last item is now:
- **Factory settings: all parameters**

In the **Device parameters** menu, the following items are added to the menu, below **Code:**
- **Service** (service date)
- **Memory** number (for a connected Alibi memory)
- **Terminal data** (serial number and model of the indicator)

The first item of the Device Parameters menu for „WP1 - Internal" is now:
- **ADC configuration.**

The **Calibration/ adjustment** menu in the Device Parameters menu for „WP1 - Internal" now contains the following additional submenus:
- **Adjust without weights**
- **Geographical data.**

The CAL key function and Activate ext. adj. submenus of the „Calibration/Adjustment" menu also contain additional menu items.

If the COM1 or COM2 interface is configured for a second weighing platform, „WP2", the additions to the „Calibration/Adjustment" menu listed above for „WP1" apply to the „WP2" menu as well. Under certain conditions, the „ADC Configuration" menu is also available for WP2 (if a weighing platform suitable for this purpose is connected and a suitable transfer protocol is used).

In general, the software detects the parameters of the connected load cell(s).
If the parameters of a given load cell cannot be detected or cannot be changed, the parameters in question might not be displayed. For example, in the „Calibration/ Adjustment" menu, the „External calibration" item is not displayed if the connected weighing cell is not configured for use in legal metrology; in other words, if it does not have a „Legal metrology" data record.

A diagram of the menu tree for the Setup menu in Service mode is shown on the following pages. As mentioned above, which menu items are shown depends on the weighing platform(s) connected.

Note:
To configure the A/D converter and to enter or change parameters in the „Calibration/Adjustment" menu, set the menu access switch to the „Accessible" position. To do this, move the switch to the right (towards the interface connectors). For details, see „Configuring the Analog/ Digital Converter" and „Calibration, Adjustment and Linearization" in this chapter, as well as the section entitled „Calibration and Adjustment" under „Operating the Combics."

Configuring the Analog/Digital Converter

Purpose

To adapt the Combics for use with any commercially available strain-gauge load cell or analog Sartorius CAPP, CAPS, IU or IF weighing platform by selecting or entering parameters in the Setup program. Access is restricted by a special password (service password).

Features

With the menu access switch open, you can configure most of the parameters affecting the following specifications:

- Toggle between „Standard“ and „Verifiable“ („Legal for trade“) mode (configuration for use in legal metrology)
- Verification scale interval e
- Scale interval d
- Minimum load
- Maximum load
- Maximum load for a given range
- Verification scale interval e for a given range
- Available weight units
- Weight unit for calibration/adjustment

These parameters are not affected when you restore the factory settings (menu item: **Factory settings: all parameters** on the highest level of the Setup menu.

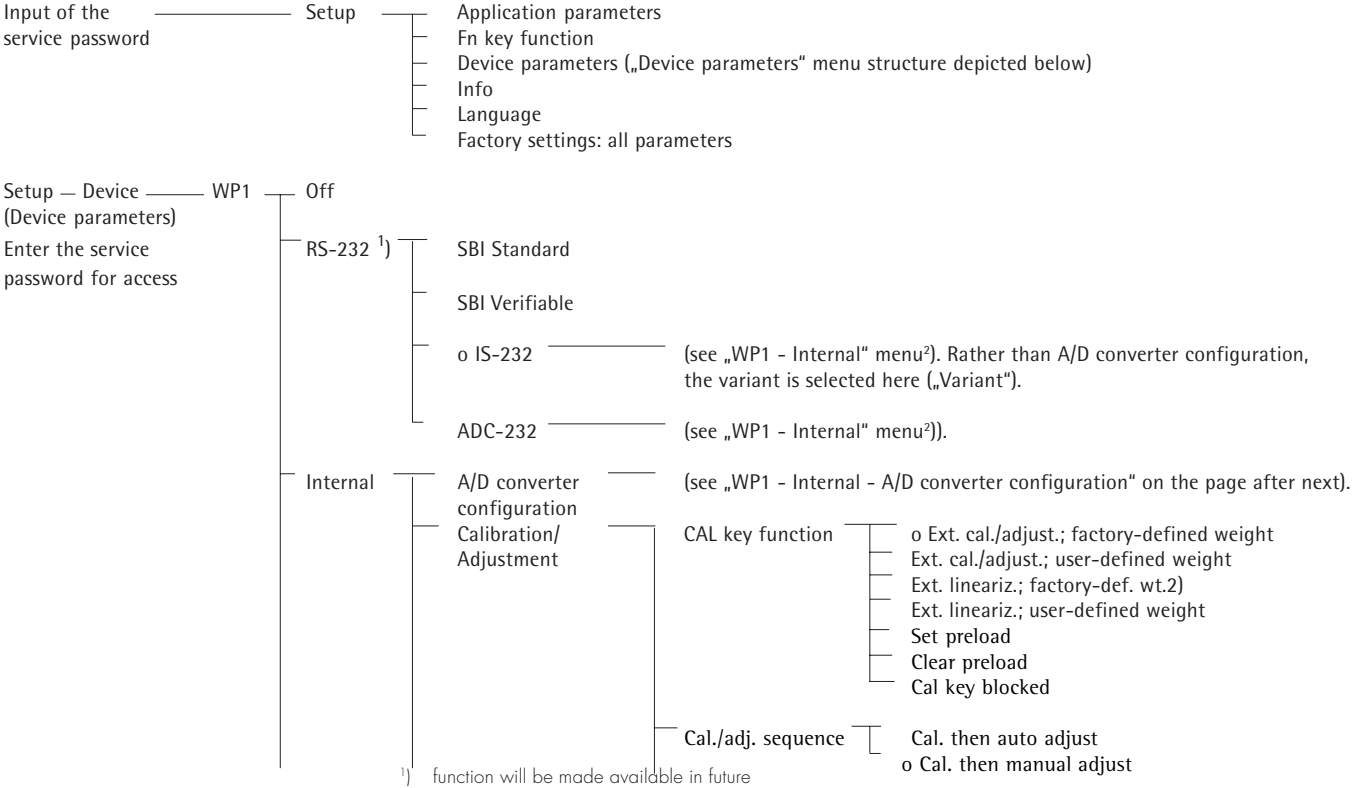
Parameters not listed above are not affected by your choice of Standard or Trade configuration; the same restrictions apply as for Sartorius weighing instruments that do not offer a choice between the two configurations.

Note on Settings

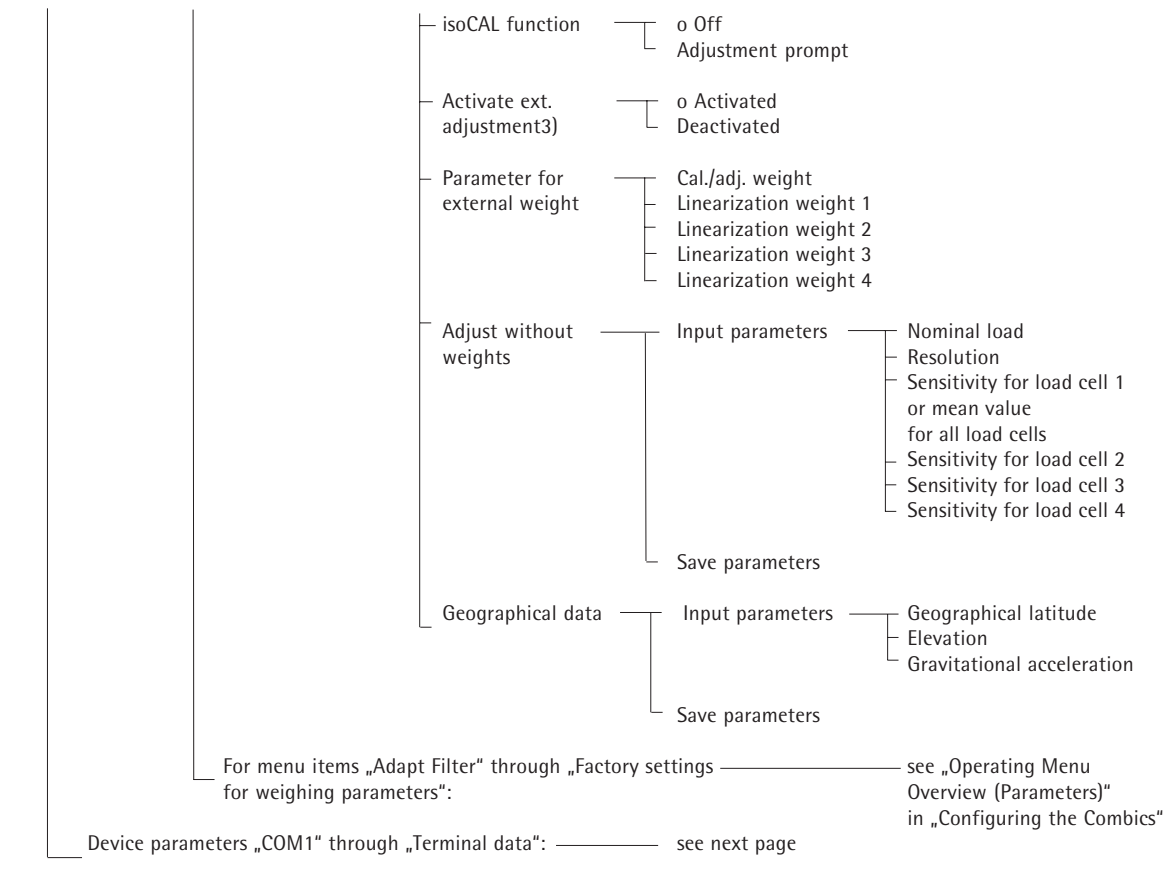
The **ADC configuration** menu is opened from the Setup menu, under **Device parameters** (weighing platform 1: **WP1**; weighingplatform 2: **COM1** or **COM2**, withs uitable transfer protocol).
The menu is shown on page 19.
The A/D converter can be configured only in the Service mode and only with the menu access switch open.

Overview of the Setup Menu in Service Mode

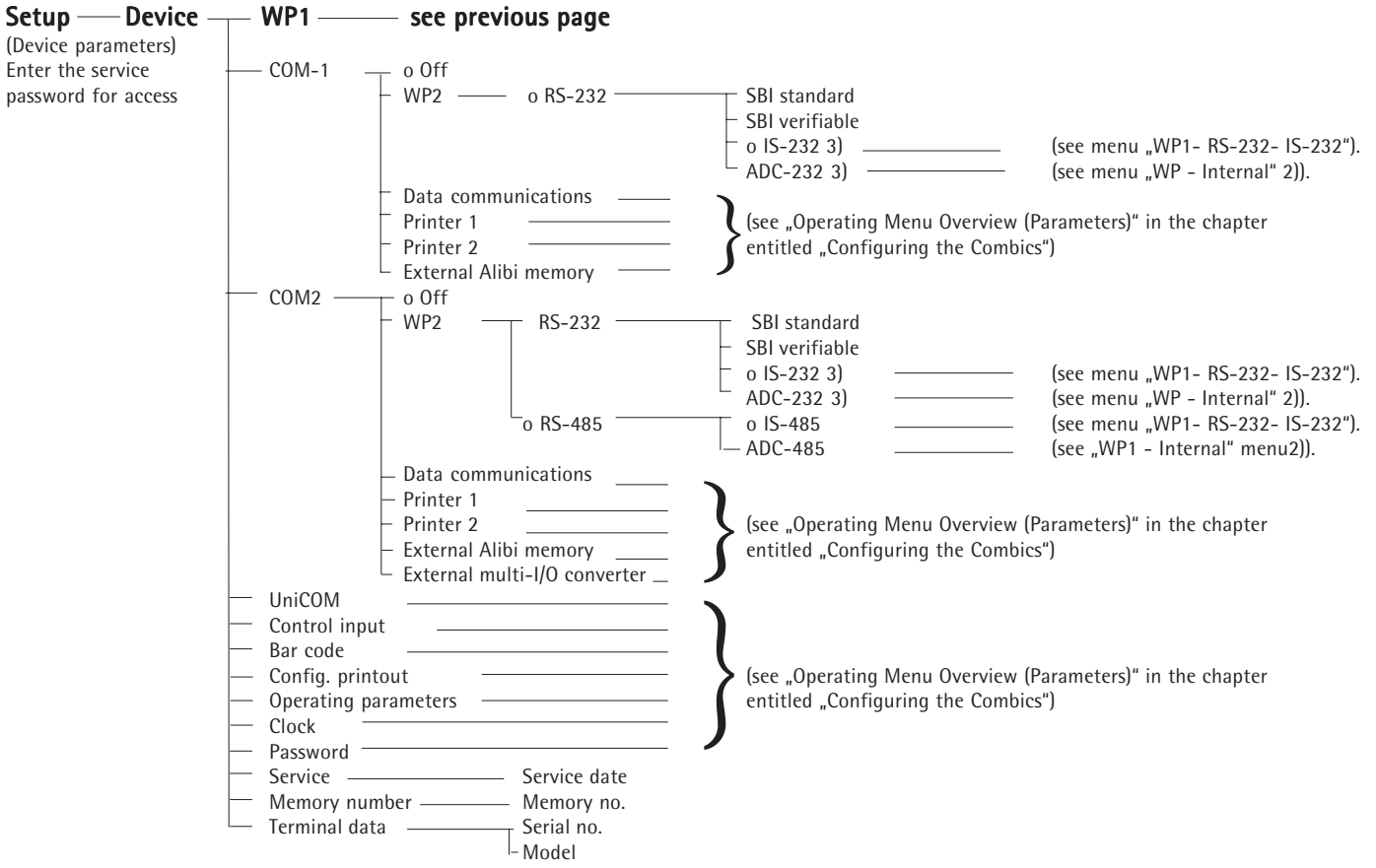
o = Factory setting
x = User-defined setting



1) function will be made available in future
2) availability of menu items depends on the software and on the functionality of the connected weighing platform
3) menu item not available on scales verified for use in legal metrology



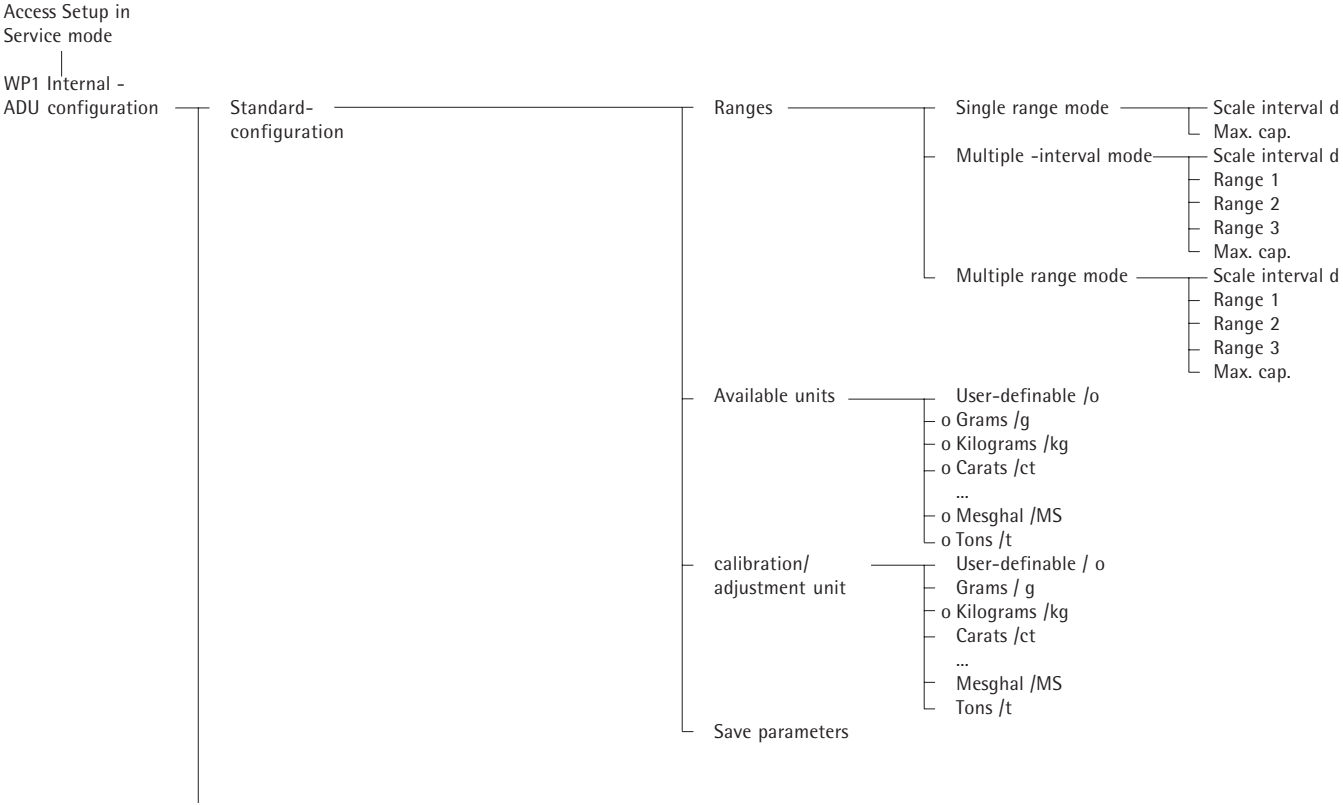
[1]) function will be made available in future
[2]) availability of menu items depends on the software and on the functionality of the connected weighing platform
[3]) menu item not available on scales verified for use in legal metrology



[1]) function will be made available in future
[2]) availability of menu items depends on the software and on the functionality of the connected weighing platform
[3]) menu item not available on scales verified for use in legal metrology

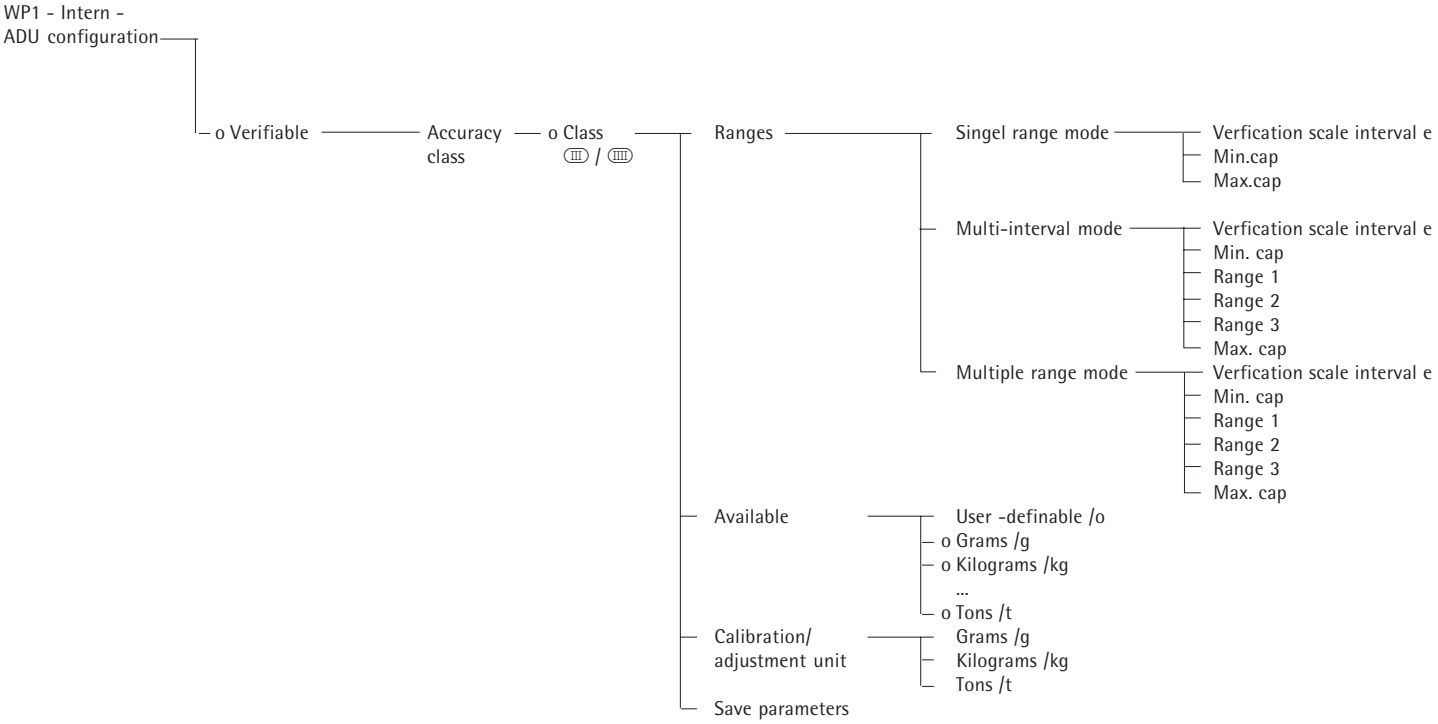
Setup-Menu for A/D Converter Configuration

Page 1



Setup-Menu for A/D Converter Configuration

Page 2



Key to Model Designations

Here is an example of how to put together order numbers. CW3P1-60 FE-LCE means the following:

Complete Combics scale with indicator 1	**(CW3P...)**;
With one load cell	**(...1...)**;
A maximum, single-range weighing capacity of 60 kg	**(...60...)**;
A platform size of 500 × 400 mm	**(...FE...)**; and
A resolution of 3,000 e for accuracy class (III)	**(...LCE)**

Complete Combics scale

CW3P

With selectable application programs. Indicator with 20 mm LCD, backlit; integrated LEDs (red-green-yellow) for checkweighing or classification; RS-232C interface port as a standard feature; port for bar code scanner or optional battery pack.

Applications: weighing; counting; checkweighing; classification into 3 or 5 classes; totalizing; net-total formulation; filling; weighing in percent; neutral measurement; animal weighing. Indicator material: stainless steel. Type of protection: IP 44.

Applications	Material | Design	Number of load cells		Capacity (kg)	Platform size mm | order code			Resolution
CW3	**P**	**1**	**-**	**60**	**FE**		**-**	**LCE**

1	**3 kg**	300×240	**(DC)**		**L**
1	**6 kg**	300×240	**(DC)**		15,000 d
1	**15 kg**	300×240	**(DC)**		
1	**30 kg**	400×300	**(ED)**		
1		500×400	**(FE)**		**I**
1	**60 kg**	400×300	**(ED)**		30,000 d
1		500×400	**(FE)**		
1		650×500	**(GF)**		
1		800×600	**(IG)**		**LCE**
1	**150 kg**	500×400	**(FE)**		3,000 e
1		650×500	**(GF)**		(verification scale
1		800×600	**(IG)**		intervals)
1	**300 kg**	650×500	**(GF)**		
1		800×600	**(IG)**		
4	**600 kg**	1,000×1,000	**(LL)**		**NCE**
4		1,250×1,000	**(NL)**		2×3,000 e
4		1,500×1,250	**(RN)**		(verification scale
4		1,500×1,500	**(RR)**		intervals in
4		2,000×1,500	**(WR)**		multiple-range
4	**1,500 kg**	1,000×1,000	**(LL)**		scales)
4		1,250×1,000	**(NL)**		
4		1,500×1,250	**(RN)**		
4		1,500×1,500	**(RR)**		
4		2,000×1,500	**(WR)**		
4	**3,000 kg**	1,000×1,000	**(LL)**		
4		1,250×1,000	**(NL)**		
4		1,500×1,250	**(RN)**		
4		1,500×1,500	**(RR)**		
4		2,000×1,500	**(WR)**		

CW3S4-1500RR-L, our example of a complete, stainless steel scale, means the following:

Complete Combics stainless steel scale with indicator 2	**(CW3S...)**;
With four load cells	**(...4...)**,
A maximum, single-range weighing capacity of 1,500kg	**(...1500...)**;
A platform size of 1,500×1,500 mm	**(...RR...)**; and
A resolution of 15,000 digits	**(...L)**

Complete Combics stainless steel scale

CW3S

With selectable application programs. Indicator with 20 mm LCD, backlit; integrated LEDs (red-green-yellow) for checkweighing or classification; RS-232C interface port as a standard feature; port for bar code scanner or optional battery pack.

Applications: weighing; counting; checkweighing; classification into 3 or 5 classes; totalizing; net-total formulation; filling; weighing in percent; neutral measurement; animal weighing. Indicator material: completely made of stainless steel. Type of protection: IP67.

Applications	Material | Design	Number of load cells		Capacity (kg)	Platform size mm | order code			Resolution
CW3	**S**	**4**	**-**	**1500**	**RR**		**-**	**L**
		1		**3 kg**	300×240	**(DC)**		**L**
		1		**6 kg**	300×240	**(DC)**		15,000 d
		1		**15 kg**	300×240	**(DC)**		
		1		**30 kg**	400×300	**(ED)**		
		1			500×400	**(FE)**		**I**
		1		**60 kg**	400×300	**(ED)**		30,000 d
		1			500×400	**(FE)**		
		1			650×500	**(GF)**		
		1			800×600	**(IG)**		**LCE**
		1		**150 kg**	500×400	**(FE)**		3,000 e (verification scale intervals)
		4			650×500	**(GF)**		
		4			800×600	**(IG)**		**NCE**
		4		**300 kg**	650×500	**(GF)**		2×3,000 e (verification scale intervals in multiple-range scales)
		4			800×600	**(IG)**		
		4		**600 kg**	800×600	**(IG)**		
		4			1,000×1,000	**(LL)**		
		4			1,250×1,000	**(NL)**		
		4			1,500×1,250	**(RN)**		
		4			1,500×1,500	**(RR)**		
		4			2,000×1,500	**(WR)**		
		4		**1,500 kg**	1,000×1,000	**(LL)**		
		4			1,250×1,000	**(NL)**		
		4			1,500×1,250	**(RN)**		
		4			1,500×1,500	**(RR)**		
		4			2,000×1,500	**(WR)**		
		4		**3,000 kg**	1,000×1,000	**(LL)**		
		4			1,250×1,000	**(NL)**		
		4			1,500×1,250	**(RN)**		
		4			1,500×1,500	**(RR)**		
		4			2,000×1,500	**(WR)**		

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